

Proposed Minimum Flow and Levels Rule for Florida Bay and Biscayne Bay MFL Update

Joel VanArman
Water Supply Dept.
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Outline

- Technical Basis for Rule Development
- Results of Scientific Peer Review
- Proposed Draft Rule Language
- Schedule
- Biscayne Bay MFL Update

Florida Bay Features



Florida Bay Features:

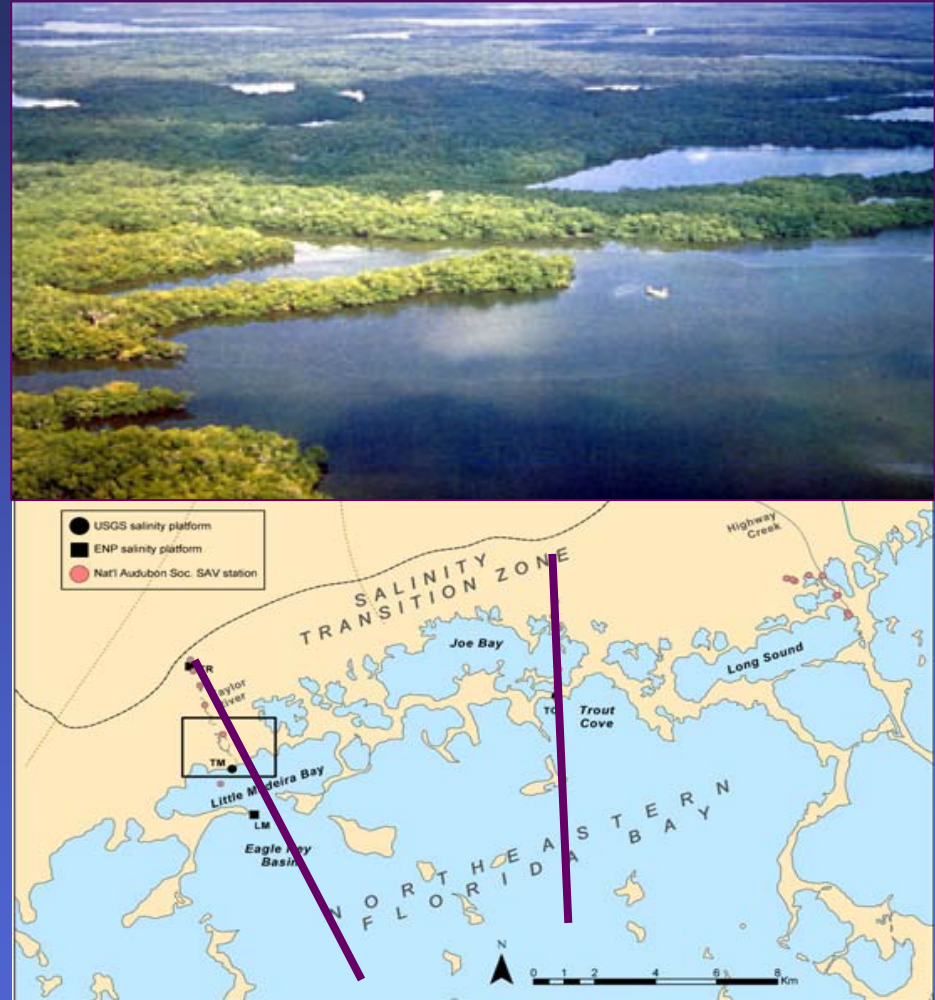
- Shallow
- Restricted water exchange
- Potential for hypersalinity
- Seagrass prominence
- Salinity largely determined by local rainfall and evaporation
- Discharges from regional system can have significant effects during very wet periods, but also in very dry periods

Evaluation Components

- Literature Review to determine salinity effects on plant and animal species
- Hydrologic Analyses to quantify water level, flow and salinity relationships
- Salinity Relationships were determined using statistical analyses, laboratory experiments and models
- Fish and Invertebrate Communities – responses to salinity and vegetation determined from historical data and statistical models

MFL Analysis Approach

- Resource - based using SAV (*Ruppia*) in transition zone ponds.
- Identify salinity threshold for significant harm to SAV indicator species
- Determine concurrent salinity impacts along a gradient from transition zone into NE Florida Bay



Summary of Hydrologic Analyses

- Direct freshwater inflow is usually a small component, but can be important, especially in NE bay during summer and fall.
- 33-yr analysis shows, under low flows:
 - Monthly ave. salinities periodically > 30 ppt in upper transition zone
 - During sustained low flow periods, salinities > 30 ppt and higher can persist for months.
 - When salinities > 30 ppt in transition zone, can reach 40 ppt or more in NE Florida Bay

Summary of Effects on Biological Resources

- *Ruppia* is lost and fails to reproduce when monthly ave. salinity >30 ppt in transition zone.
- Significant harm occurs when 30 ppt criterion is exceeded in two or more successive years.
- Historical data show significant harm occurred 5 times from 1970-2000, approx. every 6 years.
- When *Ruppia* absent, SAV habitat is lost, NE FL Bay salinities reach or exceed 40 ppt; *Halodule* SAV communities are lost.
- Hypersaline conditions and degradation of seagrass habitat impact animal communities.

Results of Peer Review

Peer Review Process

- 3 Expert Panelists
 - Dr. J. Court Stevenson (University of Md.)
 - Dr. Merryl Alber (University of Ga.)
 - Dr. Kenneth Heck (University of Al.)
- Public workshops March 29-30, in Key Largo
- Peer review panel draft report (June 14, 2006)
- Peer review comments considered during rule development, for revisions to the technical document, and to determine future research and monitoring needs

Peer Review -- Conclusions

- Approach is technically sound and assumptions are valid.
- Models and selection of indicator species are appropriate for this application.
- Theoretical responses predicted by models were supported by independent observations, but need to be further verified by continued research and monitoring.
- Field scale testing and an adaptive management approach should be used to implement the proposed criteria

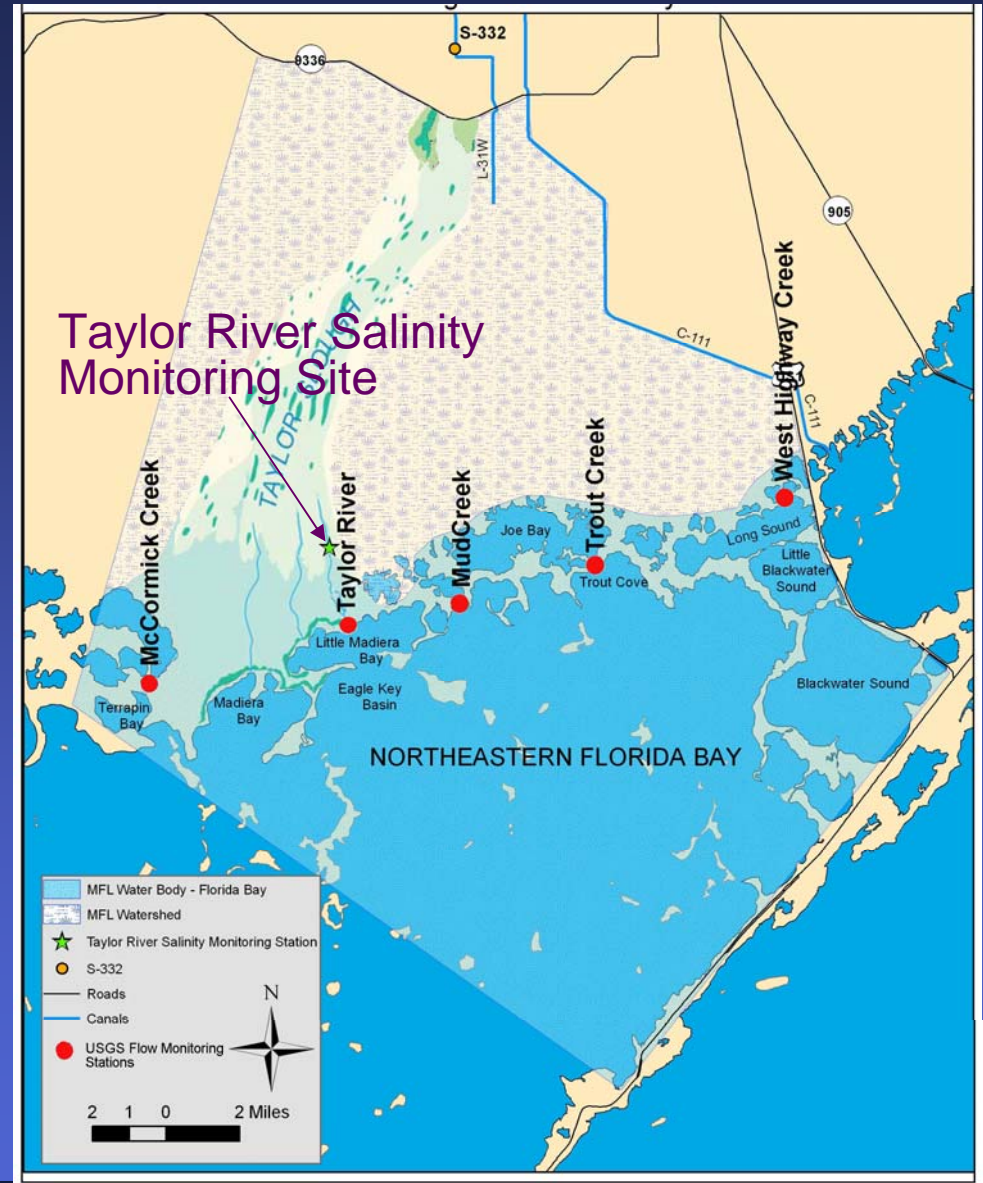
An aerial photograph of a vast mangrove forest in Florida Bay. The water is a light blue-green color, and the mangrove trees are densely packed, with their characteristic prop roots visible above the water surface. The sky is a clear, pale blue. The title text is overlaid in the center of the image.

Proposed Florida Bay MFL Rule

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Location Map

Area of Florida Bay affected by the proposed MFL Rule indicating salinity/seagrass monitoring site on Taylor River and USGS Gages where flows to the Bay are measured



40E-8.021 Definitions

- (8) Florida Bay (northeast subregion) – means the bays, basins, and sounds influenced by freshwater runoff from Taylor Slough and the C-111 Canal basin watersheds (see Figure).**

40E-8.221 Minimum Flows and Levels: Surface Waters.

(5) Florida Bay (northeast subregion)

- (a)** The minimum flow is the net discharge of 105,000 acre-feet of water over a 365 day period with at least 7,000 acre-feet between January 1st and March 31st necessary to maintain salinities as described below.
- (b)** An exceedance of the minimum flow occurs when average salinity over 30 consecutive days exceeds 30 ppt at the Taylor River site.
- (c)** A minimum flow violation occurs when two exceedances, occur within two consecutive years, more often than once in a six-year period.

40E-8.421 Prevention and Recovery Strategies

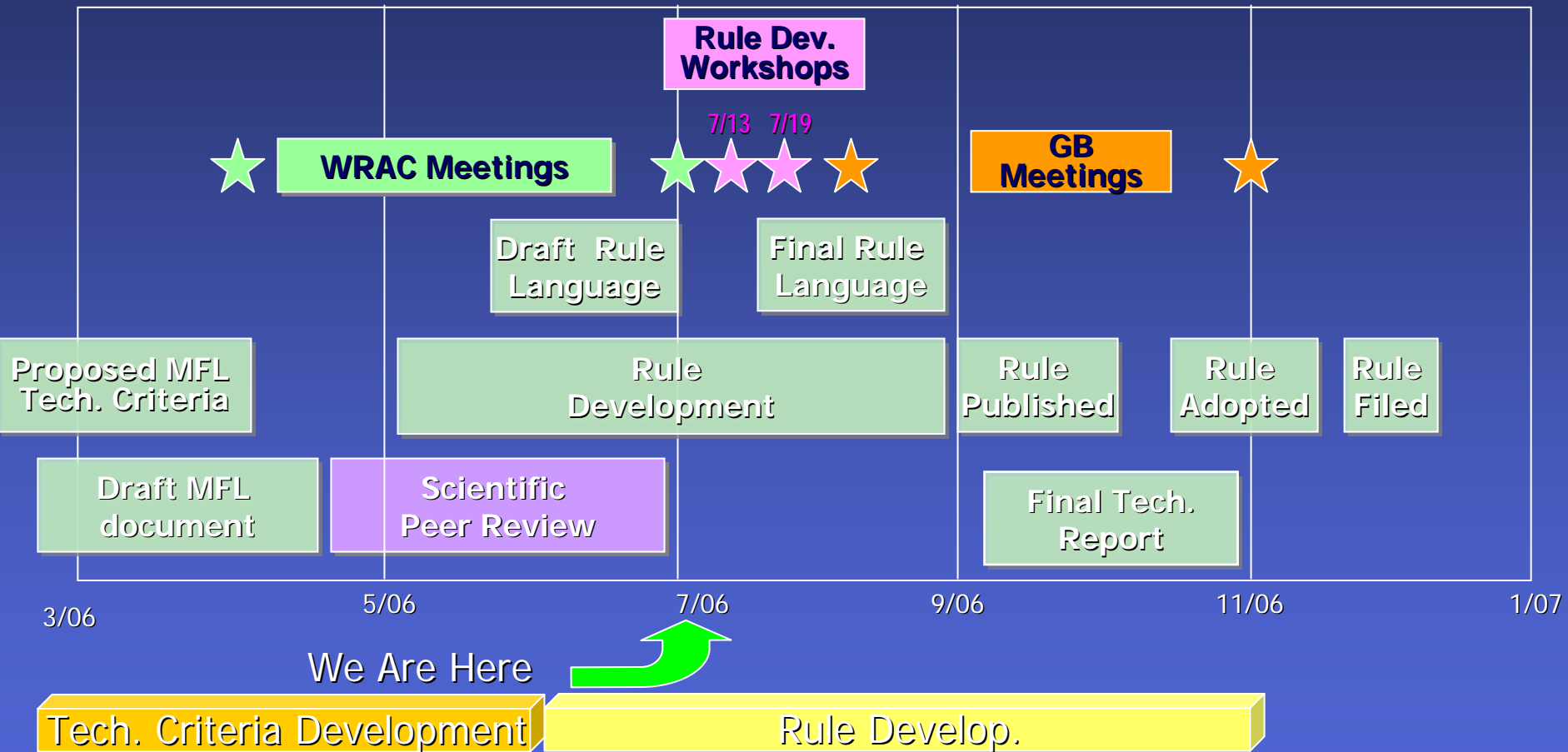
- (9) Florida Bay. In addition to the general prevention strategies identified in Rule 40E-8.421(1), the following is the prevention strategy for the Florida Bay MFL in Rule 40E-8.221(5):
- (a) Under existing system conditions violations of the MFL are not expected to occur.
 - (b) Improved operations for freshwater deliveries to Taylor River and southeast Everglades should be coordinated with the Modified Waters Deliveries to Everglades National Park, C-111 Canal, Acceler8 and CERP projects and feasibility studies

40E-8.421 (9) Prevention and Recovery Strategies (Cont.)

- (9) (c) The SFWMD, in cooperation with other agencies, will continue field monitoring, testing and research studies.**
- (d) The LEC Regional Water Supply Plan will contain the approved prevention strategy for Florida Bay**

Schedule

Schedule for Florida Bay MFL Criteria and Rule Development



Biscayne Bay Update

Internal draft technical document was prepared in May 2005

Biscayne National Park provided description of ecological management targets (June 2006)

Proceed with scientific peer review of available information (August- November '06):

- Adequacy of existing data and models
- Flow/water level/salinity relationships
- Salinity effects on biological resources
- Existing and future conditions/zonation in the Bay

Determine adequacy of technical information as a basis for MFL rule development (December '06)

Provide staff recommendations to Governing Board (January '07)

More information available at:

<http://www.sfwmd.gov/org/wsd/mfl/flbay/index.html>





Supporting Information

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Florida Bay Scientific Peer Review -- Summary Findings

1. “Widgeon grass,” *Ruppia maritima*, is an appropriate indicator species for evaluating impacts of freshwater input to the Bay.
2. The NE portion of Florida Bay is a logical place to set the MFL, since this area is most influenced by freshwater runoff and is an ideal measurement location that has considerable historical data.
3. The hydrologic models used for this analysis performed fairly well. The correlation analysis is a fairly good predictor of observed data in the transition zone and the FATHOM model is adequate in Little Madeira and Eagle Key basins.

Florida Bay Scientific Peer Review -- Summary Findings (Cont.)

4. Salinity/resource relationships described here should be expanded in the future to account for additional inflows to the Bay.
5. The proposed minimum flows may be adequate for survival of *Ruppia maritima*, but continued monitoring is needed to ensure that this is a good indicator for the rest of the system.
6. Treatment of ecology of seagrasses is detailed and modeling of plant growth and competition is “state of the art”.

Florida Bay Scientific Peer Review -- Summary Findings (Cont.)

7. Additional studies should be conducted in conjunction with other groups such as Everglades National Park and the National Audubon Society to bolster the higher trophic level (animal communities) analysis.
8. An adaptive management approach is needed. The MFL should be viewed as a field scale experiment; the annual inflow goal of 105,000 acre-ft may need to be altered depending on future ecosystem responses, which should be monitored.
9. The panel agrees with the Recommendations for Future Work.

Coordinate with Other Activities

- MFL prevention and recovery strategy must be coordinated with CSOP, Mod Waters and C-111 projects
- Ensure that deliveries of waters to Taylor River during critical periods do not compete with water needed in other areas.
- Water deliveries must also be coordinated with natural cycles of high and low water conditions in the wetlands
- Ensure that water level reversals do not occur that would adversely impact wading bird communities
- Coordinate research and monitoring needs with USGS and NPS programs and RECOVER